

REMARKS

In response to the June 13, 2007 Office Action, Applicants respond to the Examiner's detailed action with the following remarks numbered according to the Examiner's communication. Claims 13, 14, and 27-29 were pending and rejected in the application. Claims 13 and 28 are hereby canceled without prejudice and Claims 14, 27, and 29 are amended hereby.

Claim Interpretation

1. Applicants have amended the claims to refer to "columns of megasonic waves" to more clearly claim Applicants' invention.

Claim Rejections – 35 USC §102

2-3. The Examiner rejected Claims 13, 14, and 27 under 35 U.S.C. §102(b) as being anticipated by Schwartzman et al (US 4,118,649). Applicants respectfully disagree. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Applicants have cancelled Claim 13 without prejudice and amended Claim 14 to depend from Claim 27.

Shwartzman et al does not teach all the limitations of Claims 27. Particularly, as the Examiner asserts in his obviousness rejection of the claims, Shwartzman et al does not teach the orientation of the short and long sides of the transducers.

Since the Shwartzman et al does not teach all the limitations of the claims, Applicants respectfully submit that Claim 27, as well as the claims that depend therefrom, are in condition for allowance.

Claim Rejections – 35 USC §103

4-5. Applicants submit that the subject matter of the claims was commonly owned at the time of invention.

6-7. Responsive to the Examiner's rejection of Claims 13, 14, and 27 under 35 §U.S.C 103(a) as being unpatentable over Schwartzman et al (US 4,118,649), Applicants respectfully disagree.

Applicants have cancelled Claim 13 without prejudice and amended Claim 14 to depend from Claim 27.

The Examiner admits Schwartzman et al does not teach the claimed orientation of the transducers. However, the Examiner finds that all orientations are "encompassed" by the reference. Such a finding is illogical and erroneous. In effect, the Examiner has found more in the reference than the reference shows. The inventors determined that moving the wafers in a direction that is generally parallel to the short edge of the upper surface of transducer as claimed ensures that the wafers pass through the maximum megasonic energy (see the second paragraph of the Summary in the present application). The reference is silent on the orientation of the transducers.

Applicants respectfully submit that since Schwartzman et al does not teach the orientation of the transducers, Schwartzman et al does not provide any incentive for orienting the transducers such that the wafers are moved parallel to the short side of the transducer. It is not a sufficient showing of obviousness that one might accidentally orient the transducers in such a way.

Further, the Examiner has not shown that there was a recognized need in the art to improve the cleaning of the wafers by choosing one orientation of the transducers relative to the motion of the wafers over another at the time of invention. It was the inventors of the present invention that determined that the claimed orientation of the transducers and movement of the wafers exposes the wafers to the maximum amount of megasonic energy. Using the inventors' determination to overcome a deficiency in the teachings of a prior art reference is hindsight.

Claim 27 and the claims that depend therefrom are thus not obvious over Schwartzman et al and are in condition for allowance. Applicants therefore respectfully request withdrawal of the rejection.

8. The Examiner rejected Claims 13, 14, and 28 under 35 §U.S.C 103(a) as obvious over Stanasolovich et al (US 5,533,540) in view of Bran (US 4,804,007).

Applicants have cancelled Claims 13 and 28 without prejudice and amended Claim 14 to depend from Claim 27. Thus the rejection is moot.

9. Responsive to the Examiner's rejection of Claims 13, 14, and 27 – 29 under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al (US 6,085,764) in view of Handbook of Semiconductor Wafer Cleaning Technology (HSWCT) and Shwartzman et al and Bran, Applicants respectfully disagree. It is improper to modify a reference in a way that would render it unsatisfactory for its intended purpose.

The HSWCT cures the issues caused by cavitation in ultrasonic cleaning by opting for megasonic frequencies in lieu of ultrasonic frequencies. Shwartzman et al and Bran also favor the use of megasonic frequencies over ultrasonic frequencies. On the other hand, Kobayashi et al, which was filed after the publication of the HSWCT, teaches the use of ultrasonic frequencies to clean the wafers. Kobayashi et al further states that the "wafer is cleaned by cavitation in the cleaning fluid, formed by vibration of the ultrasonic vibrator." (See column 4, lines 1-37.) Thus, Kobayashi et al requires ultrasonic cavitation to clean the wafers. Forgoing the ultrasonic frequencies in favor of megasonic frequencies would eliminate the ultrasonic cavitation that Kobayashi et al requires to perform its intended function. Therefore, modifying Kobayashi et al to use megasonic frequencies by combining it with a reference teaching megasonic frequencies would render Kobayashi et al unsatisfactory for its intended purpose.

Such a combination of references is improper. Applicants therefore respectfully request withdrawal of the rejection.

10. Responsive to the Examiner's rejection of Claims 28, and 29 under 35 U.S.C. §103(a) as being unpatentable over Shwartzman et al (US 4,118,649) in view of Kobayashi et al (US 6,085,764), Applicants respectfully disagree.

Applicants have cancelled Claim 28 without prejudice. Claim 27, from which Claim 29 depends, is allowable over Shwartzman et al as described above. It is improper to combine Kobayashi et al with Shwartzman et al because the use of the megasonic frequencies of Shwartzman et al would render Kobayashi et al unsatisfactory for its intended purpose as described above.

Such a modification of a reference is improper; Applicants therefore respectfully request withdrawal of the rejection.

Response to Arguments

11. Applicants submit that the above remarks fully address the Examiner's rejections.

Conclusion

Applicants appreciate the opportunity to call the Examiner but believe that this amendment to the claims and the forgoing remarks fully address the issues raised by the Examiner. On the other hand, the Examiner is invited to call the undersigned if he has any matters to address that will facilitate allowance of the application.

Filed with this amendment and response is a petition to extend the time to answer together with the applicable fee to be paid from Deposit Account No.: 50-3010. In the event that Applicant has overlooked the need for an additional extension of time, payment of fee, or additional payment of fee, Applicants hereby conditionally petition therefore and authorize that any changes be made to Deposit Account No.: 50-3010.

Applicants respectfully request favorable consideration and the timely issuance of a Notice of Allowance in this case.

Respectfully submitted,
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